

Fig. 1. Soil pH, # MS germinated out of 50 counted, NH<sub>3</sub> concentration in soil solution, NO<sub>2</sub><sup>-</sup> and NO<sub>3</sub><sup>-</sup> content in Beauseart and Thorndale soil amended with various rates of MBM (n=3; ±standard error).

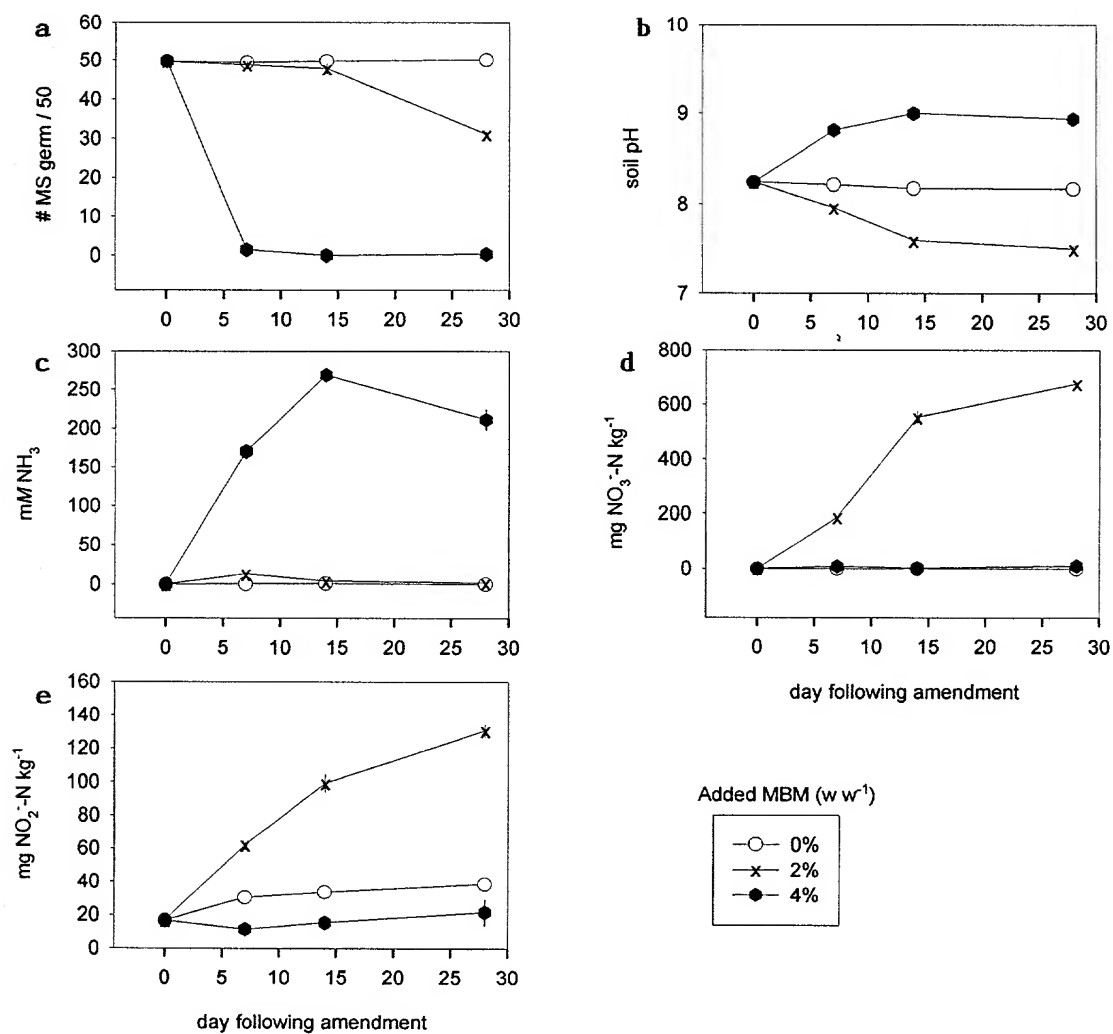


Fig. 2. Number MS germinated out of 50 counted, soil pH, NH<sub>3</sub> concentration in soil solution, NO<sub>3</sub><sup>-</sup> and NO<sub>2</sub><sup>-</sup> content of Thorndal soil amended with various rates of MBM (n=3; ±standard error).

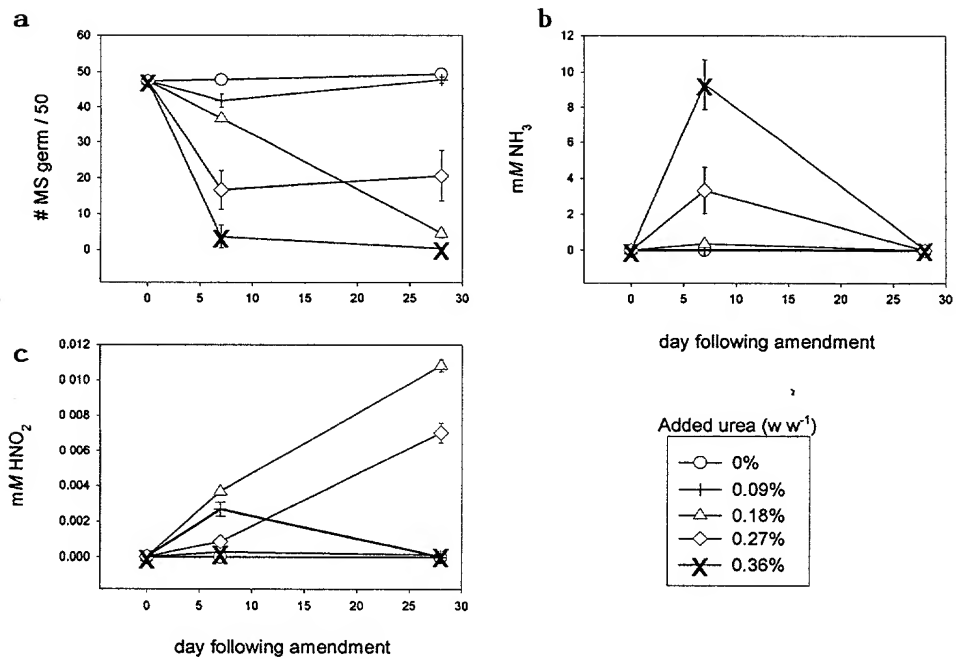


Fig. 3. Number MS germinated out of 50 counted,  $\text{NH}_3$  and  $\text{HNO}_2$  concentration in soil solution in Thorndale soil amended with various rates of urea ( $n=3$ ;  $\pm$ standard error).

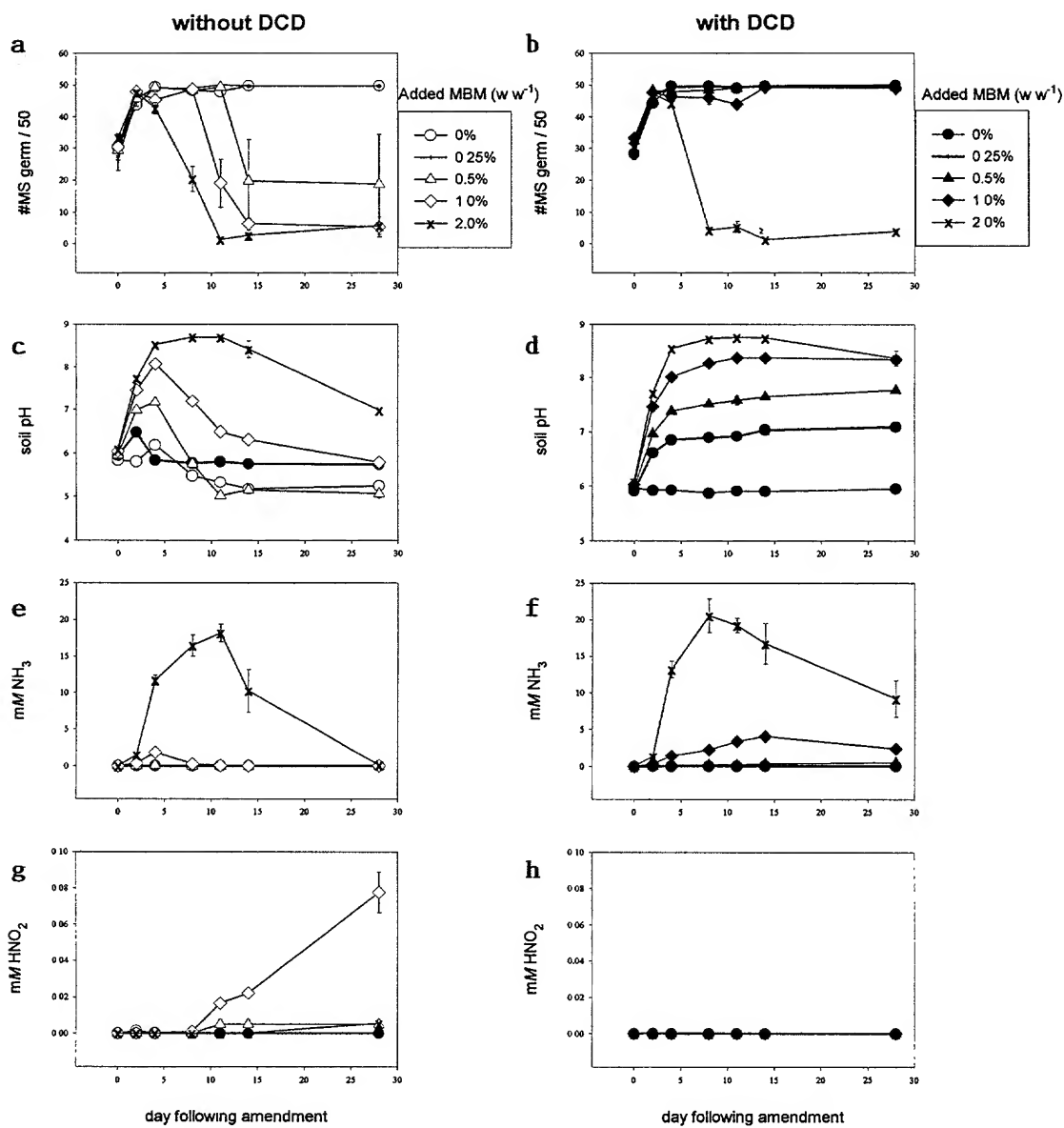


Fig. 4. Number MS germinated out of 50 counted, soil pH, NH<sub>3</sub> and HNO<sub>2</sub> concentration in soil solution in Beauseart soil (sandy loam) amended with various rates of MBM, with and without the nitrification inhibitor, dicyandiamide (DCD) added (n=3; ±standard error).

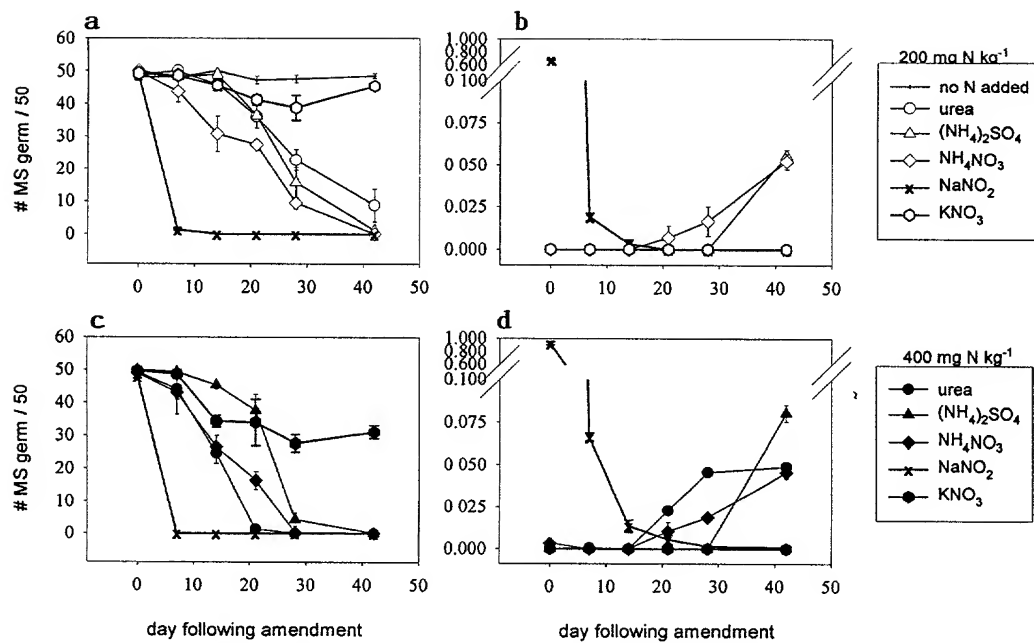


Fig. 5. Number of MS germinated out of 50 counted and  $\text{HNO}_2$  concentration in soil solution of Beauseart soil amended with various fertilizer-N sources to 200 or 400  $\text{mg N kg}^{-1}$  ( $n=3$ ,  $\pm$ standard error).

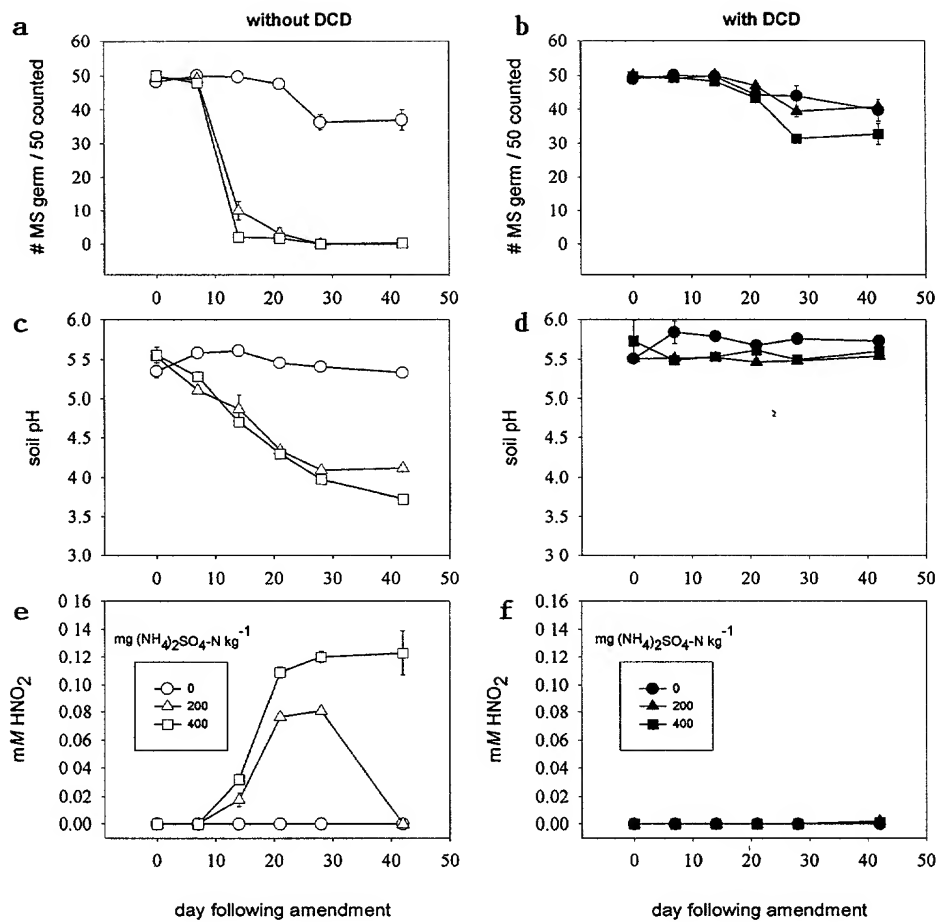


Fig. 6. Number of MS germinated out of 50 counted, soil pH and  $\text{HNO}_2$  concentration in soil solution of Mackenzie soil amended with various amounts of  $(\text{NH}_4)_2\text{SO}_4$ , with and without the nitrification inhibitor, dicyandiamide (DCD) added ( $n=3$ ;  $\pm$ standard error).

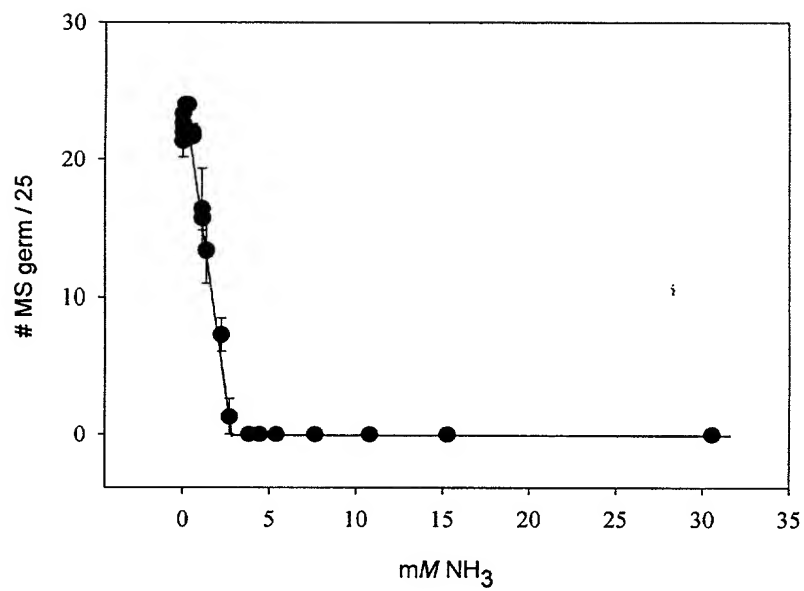


Fig. 7. Number of MS germinated out of 25 counted exposed for 2 weeks to various concentrations of NH<sub>3</sub> in solid medium (n=3;  $\pm$ standard error).

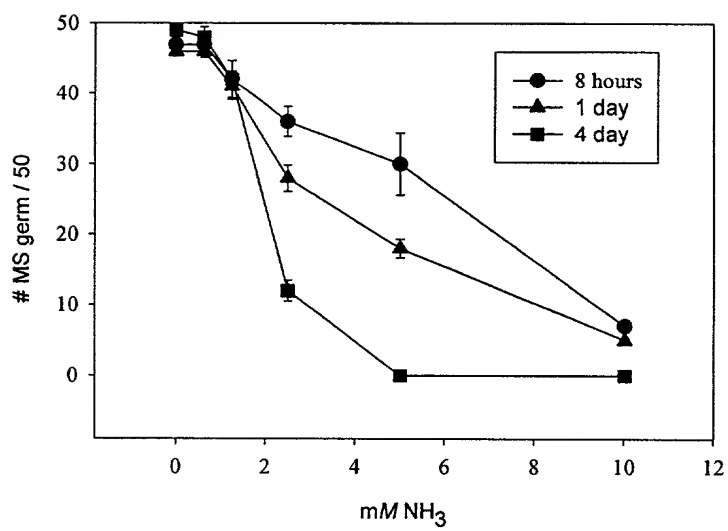


Fig. 8. Number of MS germinated out of 50 counted exposed for 8 h, 1 d and 4 d to various concentrations of  $\text{NH}_3$  in glycine buffer at pH 8.6 ( $n=3$ ;  $\pm$ standard error).



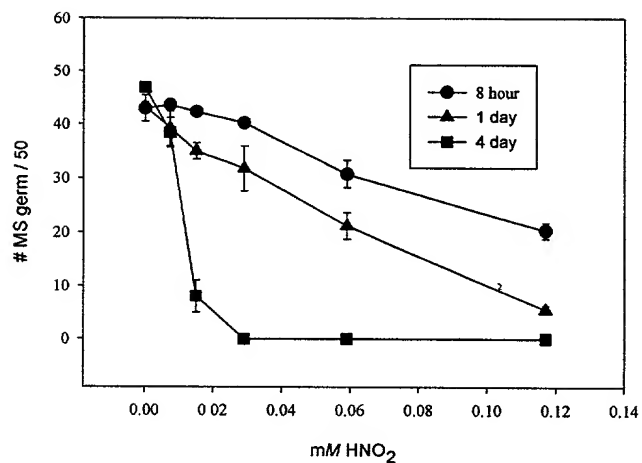


Fig. 9. Number of MS germinated out of 50 counted exposed for 8 h, 1 d and 4 d to various concentrations of HNO<sub>2</sub> in citric acid buffer at pH 5.0 (n=3;  $\pm$ standard error).

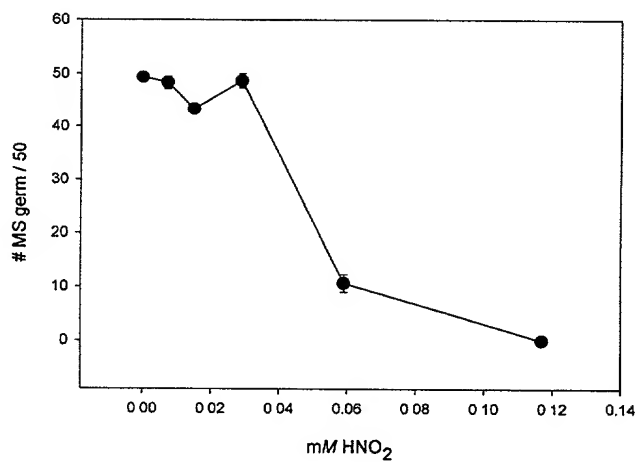


Fig. 10. Number of MS germinated out of 50 counted after suspension for 4 d to various concentrations of 30 mL HNO<sub>2</sub> in citric acid buffer at pH 5.0 in a 250 mL sealer jar (n=3;  $\pm$ standard error).

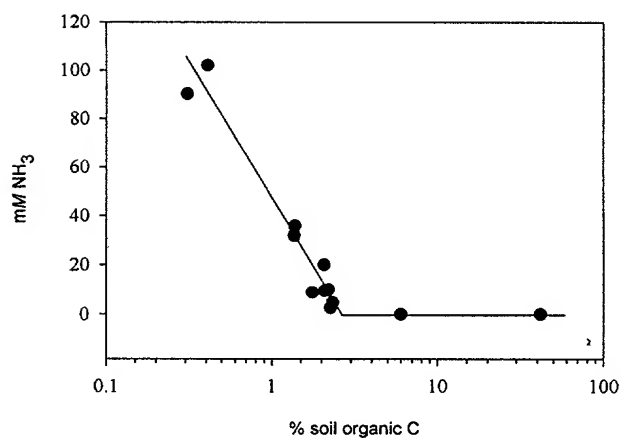


Fig. 11. Peak concentration of  $\text{NH}_3$  in soil solution measured for 12 soils amended with 2% MBM ( $\text{w w}^{-1}$ ) ( $n=3$ ;  $\pm$  standard error).

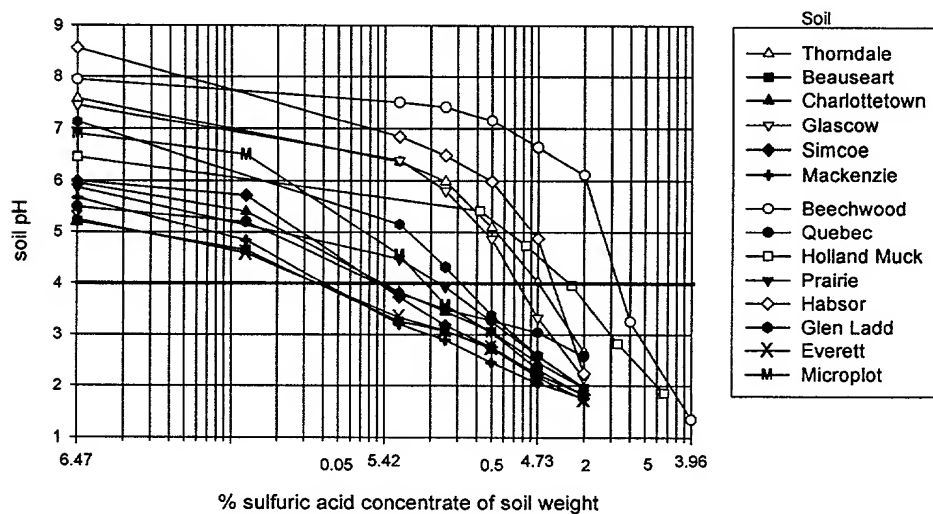


Fig. 12. Soil pH in response to addition of  $\text{H}_2\text{SO}_4$ . Soils in Group 1 are in filled symbols and Group 2 are in open symbols.

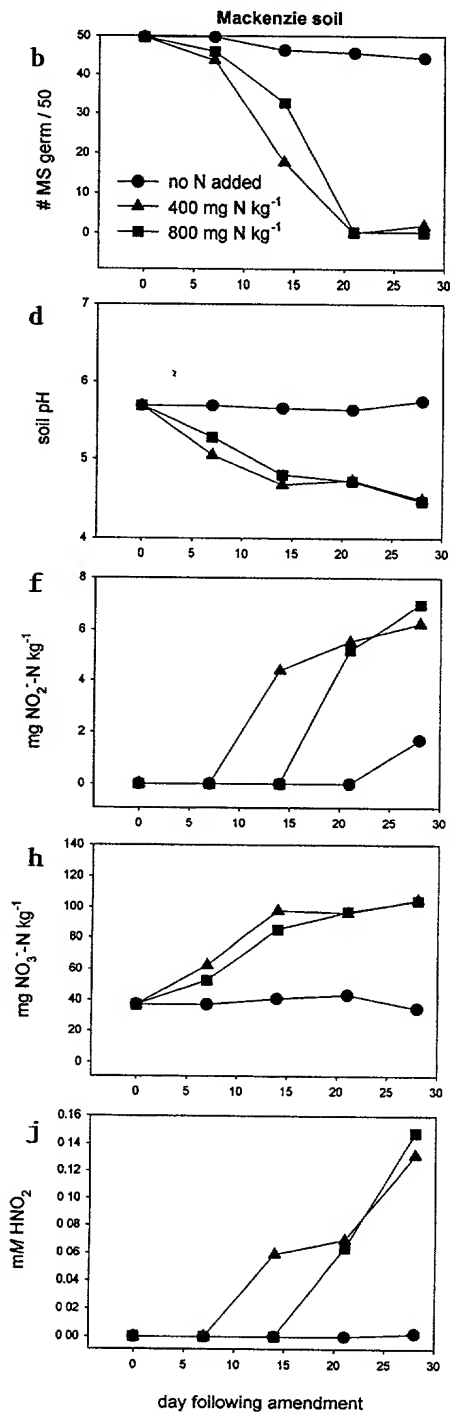
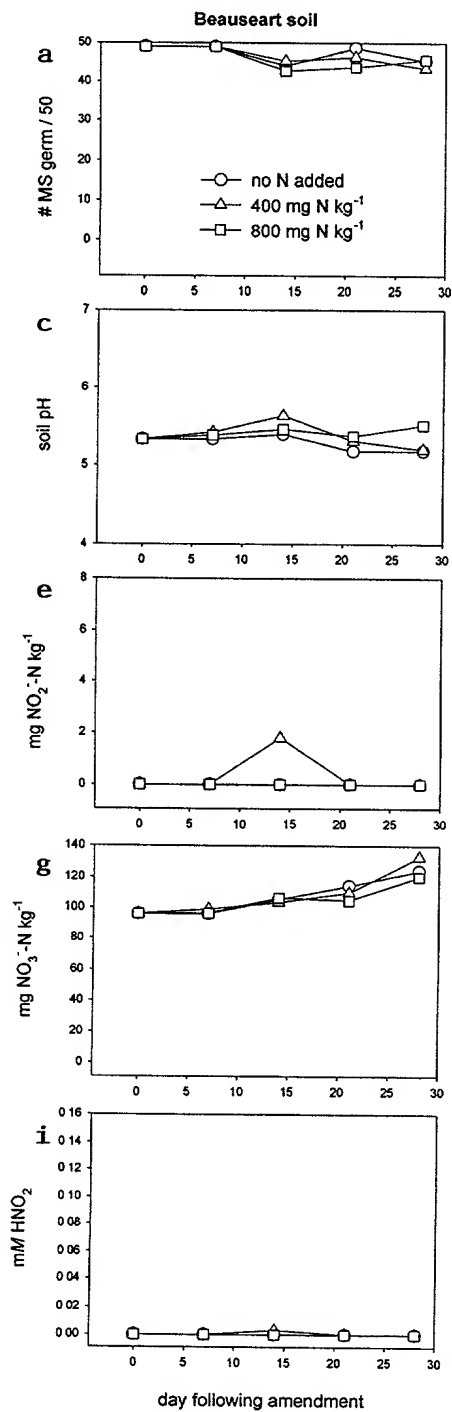


Fig. 13 Number of MS germinated out of 50 counted, soil pH, NO<sub>2</sub><sup>-</sup> and NO<sub>3</sub><sup>-</sup> content, and HNO<sub>2</sub> concentration in soil solution of Beauseart and Mackenzie soil amended with (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> to 200 or 400 mg N kg<sup>-1</sup> (n=3).

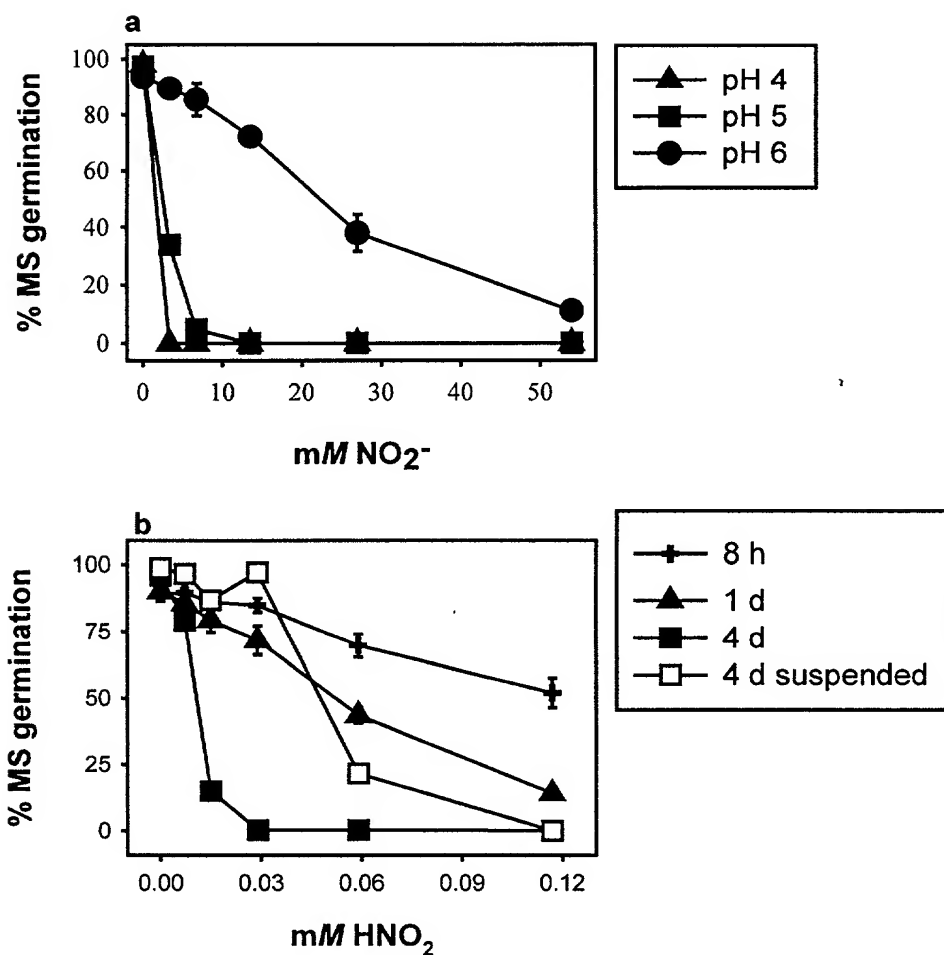


Fig. 14. Germination of *V. dahliae* MS after submergence in a 0.02 M citric acid buffered solution for a) 1 d exposure to various concentrations of NO<sub>2</sub><sup>-</sup> at a solution pH of 4, 5 or 6 and b) 8 h, 1 and 4 d exposure in, or suspended above for 4 d a solution of pH 5 containing various levels of HNO<sub>2</sub>. The concentration of HNO<sub>2</sub> was estimated based on the concentration of NaNO<sub>2</sub> and pH of the solution. Means (±1 se) of six replicates are shown.

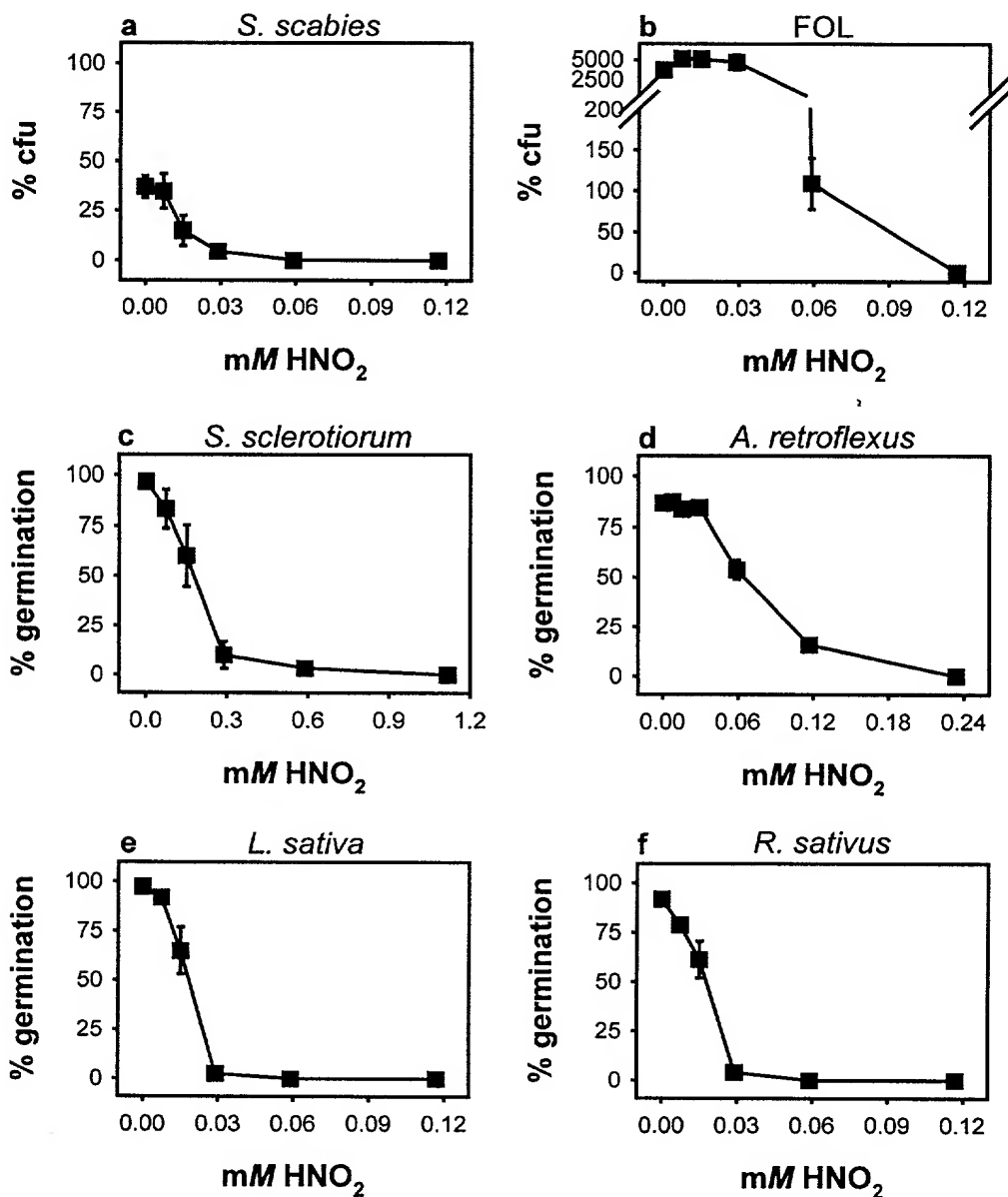


Fig. 15. Percent colony forming units (cfu) of a) spores of *Streptomyces scabies*, and b) chlamydospores of FOL, and germination of c) sclerotia of *Sclerotinia sclerotiorum*, and seeds of d) *A. retroflexus*, e) *Latuca sativa* and f) *Raphnus sativus* after submergence for 8 h, 1 and 4 d in 0.02 M citric acid buffered solutions (pH 5.0) containing various levels of HNO<sub>2</sub>. The concentration of HNO<sub>2</sub> was estimated based on the concentration of NaNO<sub>2</sub> and pH of the solution. Means ( $\pm 1$  se) of six replicates are shown.

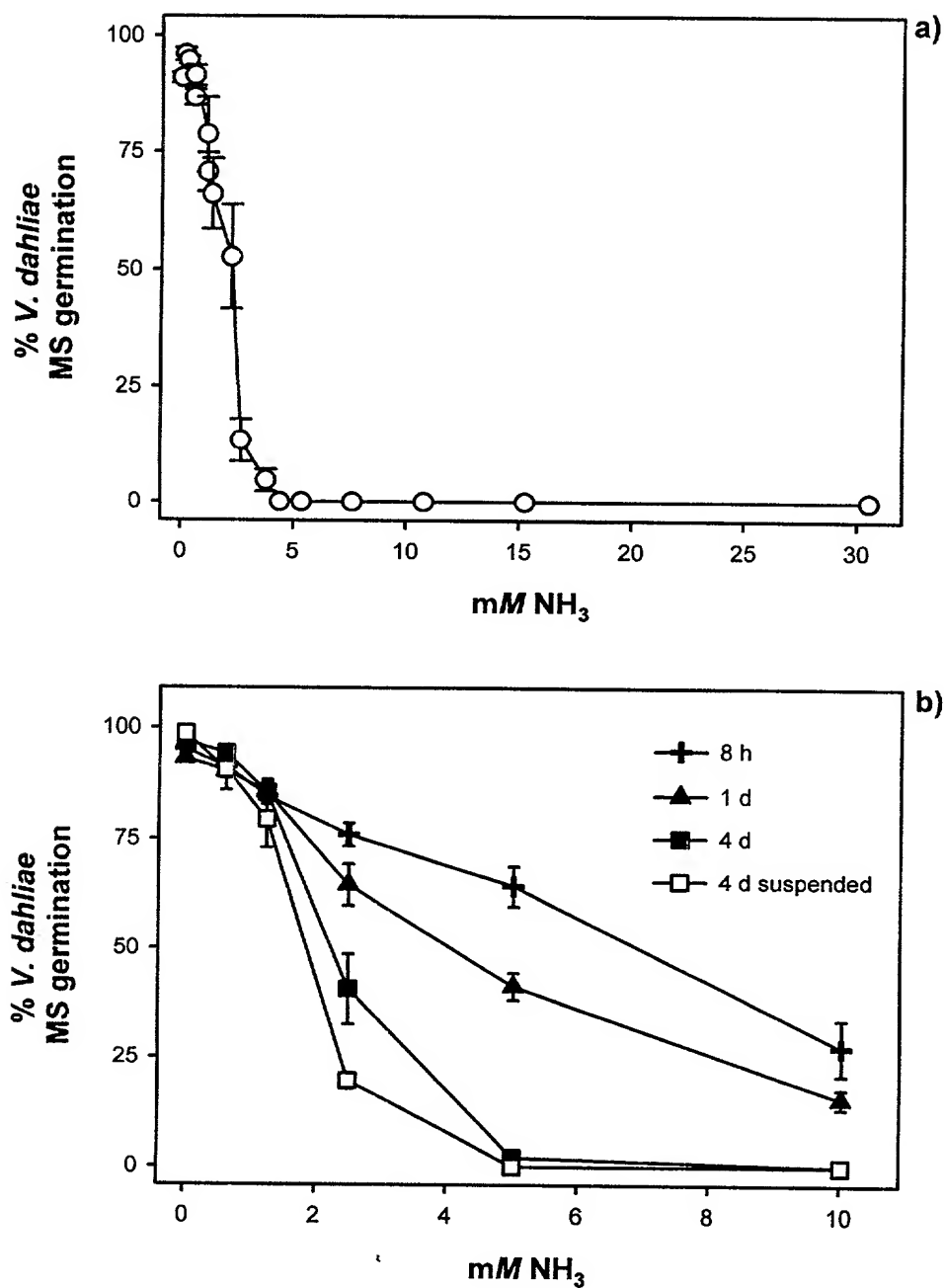


Fig. 16(a), (b)

Germination of *V. dahliae* MS after a) two weeks on soil-pectate-medium (SPT) containing various levels of  $\text{NH}_3$  and b) submergence for 8 h, 1 and 4 d in, or suspended above for 4 d a 0.05 M glycine buffered solution (of pH 8.6) containing various levels of  $\text{NH}_3$ . The concentration of  $\text{NH}_3$  was estimated based on the concentration of  $\text{NH}_4\text{Cl}$  and pH of the medium or solution. Means ( $\pm 1$  se) of six replicates are shown.

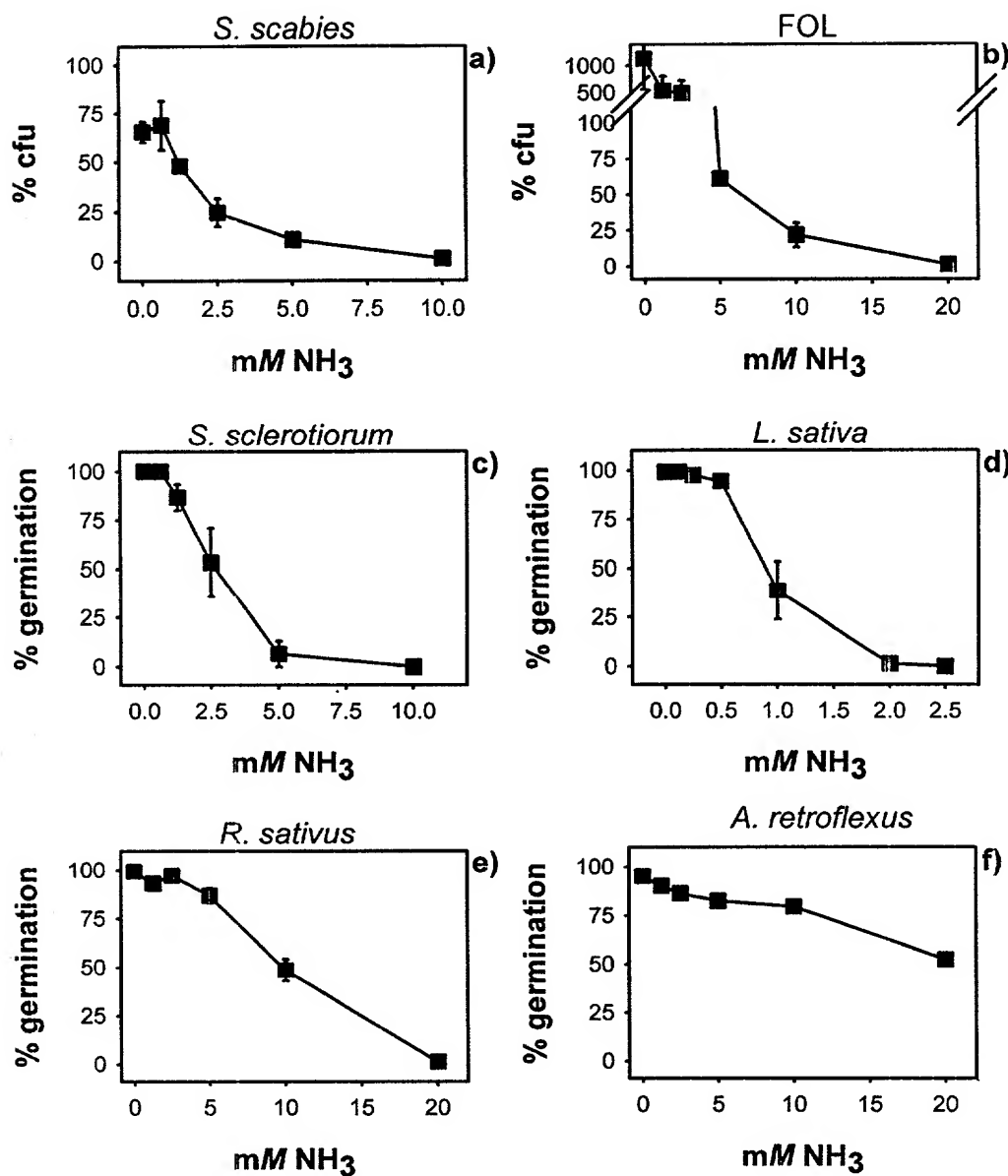


Fig. 16(c)

Colony forming units (cfu) of a) spores of *Streptomyces scabies*, and b) chlamydospores of FOL, and germination of c) sclerotia of *Sclerotinia sclerotiorum*, and seeds of d) *Latuca sativa* and e) *Raphanus sativus* after submergence for 8 h, 1 and 4 d in 0.05 M glycine buffered solutions (of pH 8.6) containing various levels of NH<sub>3</sub>. The concentration of NH<sub>3</sub> was estimated based on the concentration of NH<sub>4</sub>Cl and pH of the solution. Means ( $\pm 1$  se) of six replicates are shown.

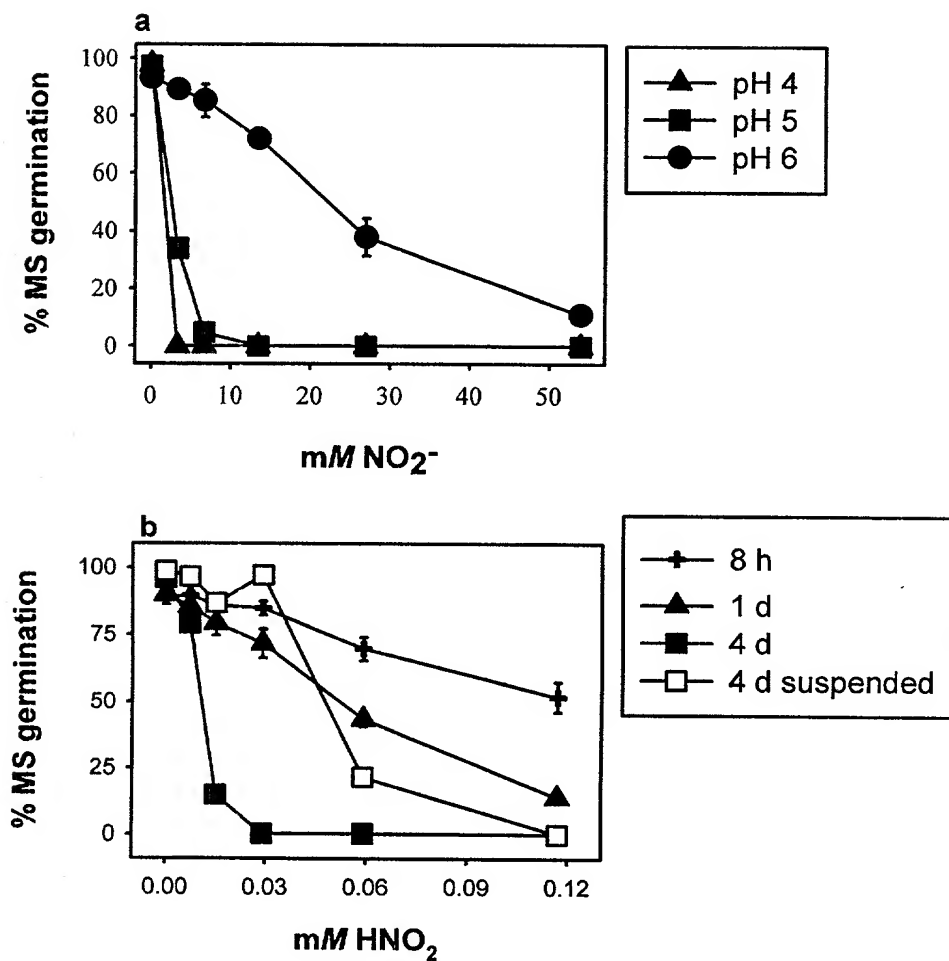


Fig. 17 (a), (b)

Germination of *V. dahliae* MS after submergence in a 0.02 M citric acid buffered solution for a) 1 d exposure to various concentrations of NO<sub>2</sub><sup>-</sup> at a solution pH of 4, 5 or 6 and b) 8 h, 1 and 4 d exposure in, or suspended above for 4 d a solution of pH 5 containing various levels of HNO<sub>2</sub>. The concentration of HNO<sub>2</sub> was estimated based on the concentration of NaNO<sub>2</sub> and pH of the solution. Means (±1 se) of six replicates are shown.



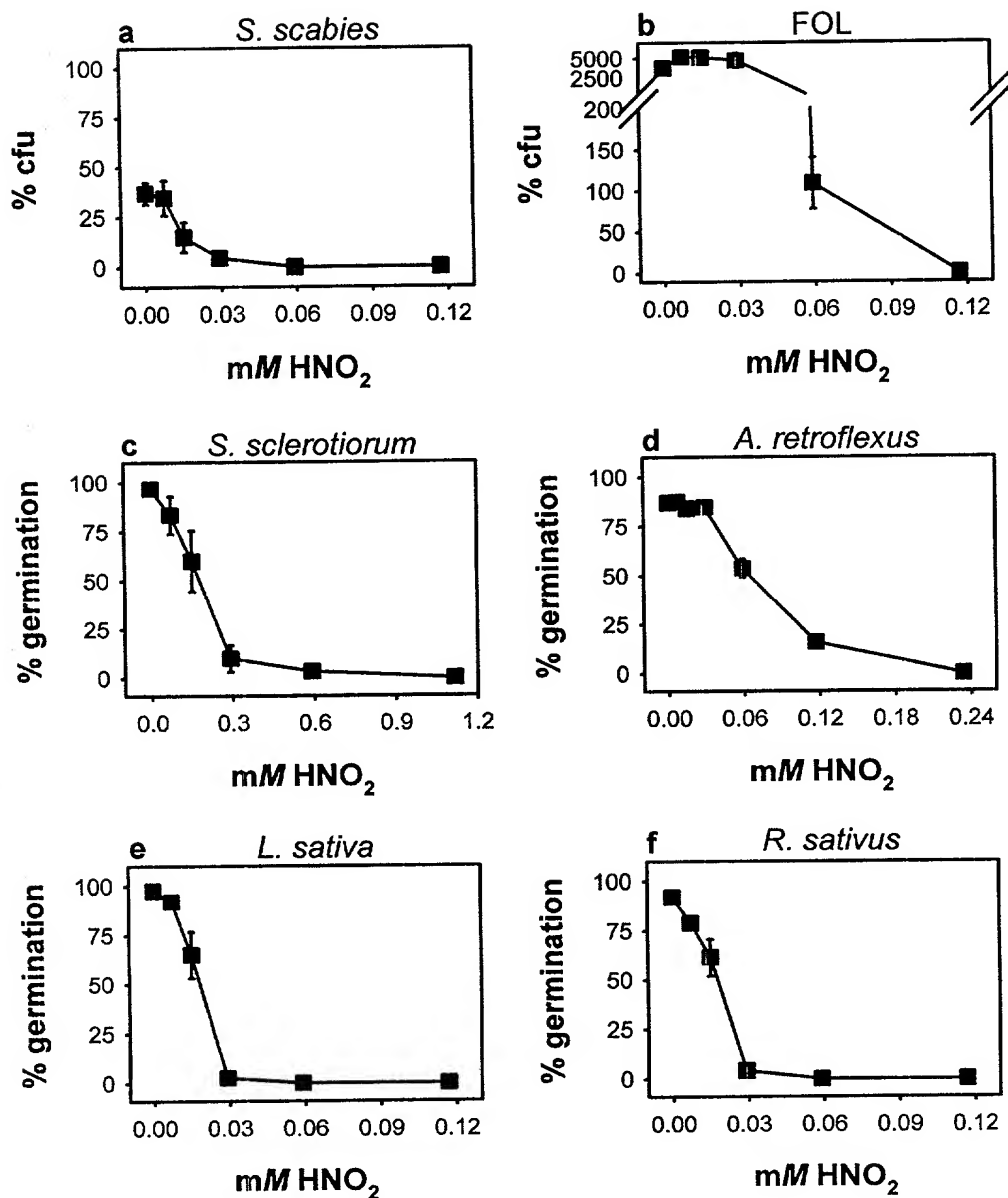


Fig. 17(c)

Percent colony forming units (cfu) of a) spores of *Streptomyces scabies*, and b) chlamydospores of FOL, and germination of c) sclerotia of *Sclerotinia sclerotiorum*, and seeds of d) *A. retroflexus*, e) *Lutuca sativa* and f) *Raphanus sativus* after submergence for 8 h, 1 and 4 d in 0.02 M citric acid buffered solutions (pH 5.0) containing various levels of HNO<sub>2</sub>. The concentration of HNO<sub>2</sub> was estimated based on the concentration of NaNO<sub>2</sub> and pH of the solution. Means ( $\pm 1$  se) of six replicates are shown.